CLAIMS

What is claimed is:

1   1.   An apparatus comprising:

2   an estimating unit to estimate a distribution of input signal level; and

3   an integrator to adjust a gain based upon the distribution for an automatic gain

4   control.

1   2.   The apparatus of claim 1, wherein the estimating unit comprises:

2   a comparator to compare the input signal against one or more reference threshold

3   values; and

4   a counter to estimate the distribution by counting occurrences in which the input

5   signal level is either above or below the one or more reference threshold values within

6   a given period.

1   3.   The apparatus of claim 2, wherein:

2   the comparator compares the input signal level against a first reference

3   threshold value and a second threshold value; and

4   the counter counts occurrences in which the input signal level is above the first

5   reference threshold value and occurrences in which the input signal level is below the

6   second reference threshold value.

1   4.   The apparatus of claim 3, wherein the first reference threshold value is higher

2   than the second reference threshold value.

1   5.   The apparatus of claim 4, wherein the counter counts up when the input signal

2   level is above the first reference threshold value and counts down when the input signal

3   level is below the second reference threshold value.

1   6.   The apparatus of claim 2, wherein the integrator adjusts the gain based upon the

2   occurrences counted during the given period.

1   7.   The apparatus of claim 2, wherein the estimating unit further comprises a

2   variable step size generator, and wherein:

3   the counter to determine a percentage of time that the input signal level is either

4   above or below the one or more reference threshold values within the given period, and

5   generates an error signal;

6   the variable step size generator to select a step size factor based upon the error

7   signal and to multiply the error signal with the selected step size factor to generate a

8   variable error signal; and

9   the integrator to adjust the gain in accordance with the variable error signal.

1   8.   The apparatus of claim 7, wherein the variable step size generator selects a large

2   step size factor if the error signal is above a predetermined value.

1   9.   The apparatus of claim 1, further comprising a variable step size generator to

2   vary the speed by which the integrator adjusts the gain by gear shifting based upon the

3   distribution.

1   10.   A method comprising:

2   estimating a distribution of input signal level; and

3   adjusting a gain based upon the distribution for an automatic gain control.

1   11.   The method of claim 10, wherein estimating the distribution comprises:

2   comparing the input signal level against one or more reference threshold values;

3   and

4   estimating the distribution by counting occurrences in which the input signal

5   level is either above or below the one or more reference threshold values within a given

6   period.

1   12.   The method of claim 11, wherein:

2   comparing the input signal level against a first reference threshold value and a

3   second threshold value; and

4   counting occurrences in which the input signal level is above the first reference

5   threshold value and occurrences in which the input signal level is below the second

6   reference threshold value.

1   13.   The method of claim 12, wherein the first reference threshold value is higher

2   than the second reference threshold value.

1   14.   The method of claim 13, wherein counting up when the input signal level is

2   above the first reference threshold value and counting down when the input signal level

3   is below the second reference threshold value.

1   15.   The method of claim 11, wherein adjusting the automatic gain control based

2   upon the occurrences counted during the given period.

1   16.   The method of claim 11, wherein estimating the distribution further comprises:

2   determining a percentage of time that the input signal level is either above or

3   below the one or more reference threshold values within the given period, and

4   generating an error signal;

5   selecting a step size factor based upon the error signal and multiplying the error

6   signal with the selected step size factor to generate a variable error signal; and

7   adjusting the gain in accordance with the variable error signal.

1   17.   The method of claim 16, wherein selecting a large step size factor if the error

2   signal is above a predetermined value.

1   18.   The method of claim 10, further comprising varying the speed by which the

2   gain is adjusted by gear shifting based upon the distribution.

1   19.   An instruction loaded in a machine readable medium comprising:

2   a first group of instructions to estimate a distribution of input signal level; and

3   a second group of instruction to adjust a gain based upon the distribution for an

4   automatic gain control.

1   20.   The instruction of claim 19, wherein the first group of instructions comprises:

2   a third group of instructions to compare the input signal level against one or more

3   reference threshold values; and

4   a fourth group of instructions to estimate the distribution by counting

5   occurrences in which the input signal level is either above or below the one or more

6   reference threshold values within a given period.

1   21.   The instruction of claim 20, wherein:

2   the third group of instructions include instructions to compare the input signal

3   level against a first reference threshold value and a second threshold value; and

4   the fourth group of instructions include instructions to count occurrences in

5   which the input signal level is above the first reference threshold value and occurrences

6   in which the input signal level is below the second reference threshold value.

1   22.   The instructions of claim 20, wherein the first group of instructions further

2   comprises a fifth group of instructions, and wherein:

3   the fourth group of instructions to determine a percentage of time that the input

4   signal level is either above or below the one or more reference threshold values within

5   the given period, and generating an error signal;

6   the fifth group of instructions to select a step size factor based upon the error

7   signal and to multiply the error signal with the selected step size factor to generate a

8   variable error signal; and

9   the second group of instructions to adjust the gain in accordance with the

10   variable error signal.

1   23.   The instruction of claim 19, further comprising a third group of instructions to

2   vary the speed by which the gain is adjusted by gear shifting based upon the

3   distribution.

1   24.   A communication system comprising:

2   a transmitter to transmit an analog signal;

3   a receiver to receive the analog signal, the receiver including an automatic gain

4   control unit to maintain a constant level of the analog signal for processing in the

5   receiver, the automatic gain control unit including:

6   an estimating unit to estimate a distribution of input signal level; and

7   an integrator to adjust a gain based upon the distribution for the

8   automatic gain control.

1 25.   The communication system of claim 24, wherein the estimating unit comprises:

2   a comparator to compare the input signal level against one or more reference

3   threshold values; and

4   a counter to estimate the distribution by counting occurrences in which the input

5   signal level is either above or below the one or more reference threshold values

6   within a given period.

1 26.   The communication system of claim 25, wherein:

2   the comparator compares the input signal level against a first reference

3   threshold value and a second threshold value; and

4   the counter counts occurrences in which the input signal level is above the first

5   reference threshold value and occurrences in which the input signal level is below the

6   second reference threshold value.

1 27.   The communication system of claim 26, wherein the first reference threshold

2   value is higher than the second reference threshold value.

1 28.   The communication system of claim 25, wherein the automatic gain control unit

2   further comprises a variable step size generator, and wherein:

3   the counter determines a percentage of time that the input signal level is either

4   above or below the one or more reference threshold values within the given period, and

5   generate an error signal;

6   the variable step size generator selects a step size factor based upon the error

7   signal and multiplies the error signal with the selected step size factor to generate a

8   variable error signal; and

9   the integrator adjusts the gain in accordance with the variable error signal.

1   29.   An automatic gain control apparatus comprising:

2   a comparator to compare input signal level against one or more reference threshold

3   values;

4   a counter to count occurrences in which the input signal level is either above or

5   below the one or more reference threshold values within a given period; and

6   an integrator to adjust a gain for automatic gain control, the gain adjusted based

7   upon the occurrences counted.

1   30.   The apparatus of claim 29, wherein:

2   the comparator compares the input signal level against a first reference

3   threshold value and a second threshold value; and

4   the counter counts occurrences in which the input signal level is above the first

5   reference threshold value and occurrences in which the input signal level is below the

6   second reference threshold value.

1   31.   The apparatus of claim 30, wherein the first reference threshold value is higher

2   than the second reference threshold value.

1   32.   The apparatus of claim 31, wherein the counter counts up when the input signal

2   level is above the first reference threshold value and counts down when the input signal

3   level is below the second reference threshold value.

1   33.   The apparatus of claim 29, further comprising a variable step size generator, and

2   wherein:

3   the counter determines a percentage of time that the input signal level is either

4   above or below the one or more reference threshold values within the given period, and

5   generate an error signal;

6   the variable step size generator selects a step size factor based upon the error

7   signal and multiplies the error signal with the selected step size factor to generate a

8   variable error signal; and

9   the integrator adjusts the gain in accordance with the variable error signal.

1   34.   A method for automatic gain control comprising:
2   comparing input signal level against one or more reference threshold values;
3   counting occurrences in which the input signal level is either above or below the
4   one or more reference threshold values within a given period; and

5   adjusting a gain for automatic gain control based upon the occurrences counted.

1   35.   The method of claim 34, wherein:
2   comparing the input signal level against a first reference threshold value and a
3   second threshold value; and
4   counting occurrences in which the input signal level is above the first reference
5   threshold value and occurrences in which the input signal level is below the second
6   reference threshold value.

1   36.   The method of claim 34, wherein further comprising varying the speed by
2   which the gain is adjusted by gear shifting based upon the distribution.
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